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THE ACTIVITY/SPACE, A LEAST COMMON DENOMINATOR FOR ARCHITECTURAL PROGRAMMING.

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TWO INTERRELATED PROBLEM AREAS OF ARCHITECTURAL PROGRAMING ARE DISCUSSED--(1) "NEEDS DEFINITION," AND (2) "NEEDS DOCUMENTATION AND COMMUNICATION". FUNDAMENTAL ISSUES AND WORK OF THE CENTER FOR ARCHITECTURAL RESEARCH ARE PRESENTED. ISSUES ARE THE FAILURE TO RECOGNIZE HOW, WHEN, AND IN WHAT FORM THE NEED WILL BE USED. CRITERIA FORMULATION MUST BE CONSIDERED IN TERMS OF "ORIGIN TO DESTINATION." AN INITIAL QUANTUM IS DEVELOPED--"THE ACTIVITY/SPACE." THIS IS DEFINED AS AN ACTIVITY WHICH TAKES UP SPACE AND HAS A GENERALLY COMMON SET OF FACILITY IMPLICATIONS. THE FILE CABINET APPROACH TO PROGRAMING, "COMMERCE," AND "PHYSICAL AFFINITY" ARE SUCCEEDING STEPS DISCUSSED ALONG WITH POSSIBLE COMPUTER IMPLICATIONS. THIS PAPER WAS PRESENTED AT THE AIA ARCHITECT-RESEARCHERS' CONFERENCE, GATLINBURG, TENNESSEE, OCTOBER 25, 1967. (RK)

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a paper presented to the AIA Architect-Researcher Conference, Gatlinburg, Tennessee, 25 October 1967 by David S. Haviland, Assistant Professor of Architecture, Center for Architectural Research, Rensselaer Polytechnic Institute, Troy, New York.

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One does not have to sit in on discussions of architectural programming for very long before he realizes that the issue is a big one, a nut with many facets and aspects, a nut which is going to be particularly difficult to crack.

While it is possible to split and categorize the nut in many different ways, I should like to make a division of my own -- for my own devices. That is, to divide the problem of architectural programming into two primary but interrelated problem areas.

The first problem area is that of NEEDS DEFINITION, the spelling out of what the client does, how he does it, and what its environmental needs and facility implications are. This, of course, forays into man and his needs, and results in explorations in sociology, psychology, physiology, and other human-oriented disciplines. It involves, too, a careful and sometimes minute dissection of the client. This aspect of programming is tremendously significant and is currently receiving a great deal of very deserved emphasis, both in architecture and in the related fields mentioned.

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I should like to address my remarks to a second problem area, however: NEEDS DOCUMENTATION AND COMMUNICATION. This involves the taking of the needs and implications derived above, collecting them, documenting them, and transmitting them to their ultimate users. This is not entirely distinct from the area of needs definition -- indeed, the way a need is defined will have a great deal to do with its communication and use -- but it does go a great deal farther than just deciding what words will be used, or what format will be employed. It begins to get at the very structure of the programming, programming/design, and design processes.

Today I would like to focus in on this particular part of the problem, expressing what I feel to be some of the fundamental issues, and presenting some work done at the Center for Architectural Research toward attacking those issues. I should say at the outset that the attack is necessarily along a limited front -- not only is it aimed at a small part of the overall "programming problem", but it also was undertaken as part of a very real program-developing research project for a very real client and with a very real deadline!

* *

What is a fundamental fault in our usual documentation and communication of needs? Simply stated, we usually fail to recognize how our need -- beautifully researched and brilliantly described -- will be used by the architect or others working on the project. We fail to predict when it will be used, and in what form. We fail to recognize that the same piece of information may be used at many points in the project, each time in a different context, and each time requiring the statement of the need in a different form.

Very simply, it is possible to view the design process as the continuous taking of criteria of some sort, the development of solutions to fulfill the criteria, the evaluation of solution against criteria, and the making of necessary adjustments (in either solution or criteria) to insure an accurate "fit".

The user does not go through this act once in a process of producing a single project (Figure 1). Rather he goes through it again and again: in making broad site and economic designs, in doing general concept work, in working with building areas and rooms, in making decisions about electrical outlets and doorknobs. "Criteria", therefore are used throughout the design process -- not just at one magic moment where the architect sits down and says, "Hand me the criteria, boys"!

And yet this is precisely what we have been doing. We get all the facts together, we collate, organize, categorize, and sometimes synthesize them into a single package called the "building program". Once it is written, and the introduction added by a famous man, we hand it over to the architect -- "Here, fella, here's the criteria".

To repeat, the rather traditional building program fails to recognize that these criteria will be called on at many stages in the programming/design processes, for a variety of ends, to be manipulated and used in a variety of ways. So on the one hand, when we speak of criteria and their formulation, we must be conscious of the USE TO WHICH THEY WILL BE PUT -- THEIR "DESTINATION" IF YOU WILL.

On the other hand, however, we must also consider their ORIGIN -- WHERE DO THEY COME FROM? Now it's obvious that many of these criteria are already in the architect's mind, or in conveniently accessible places, as he designs. Information on locations of doorknobs and

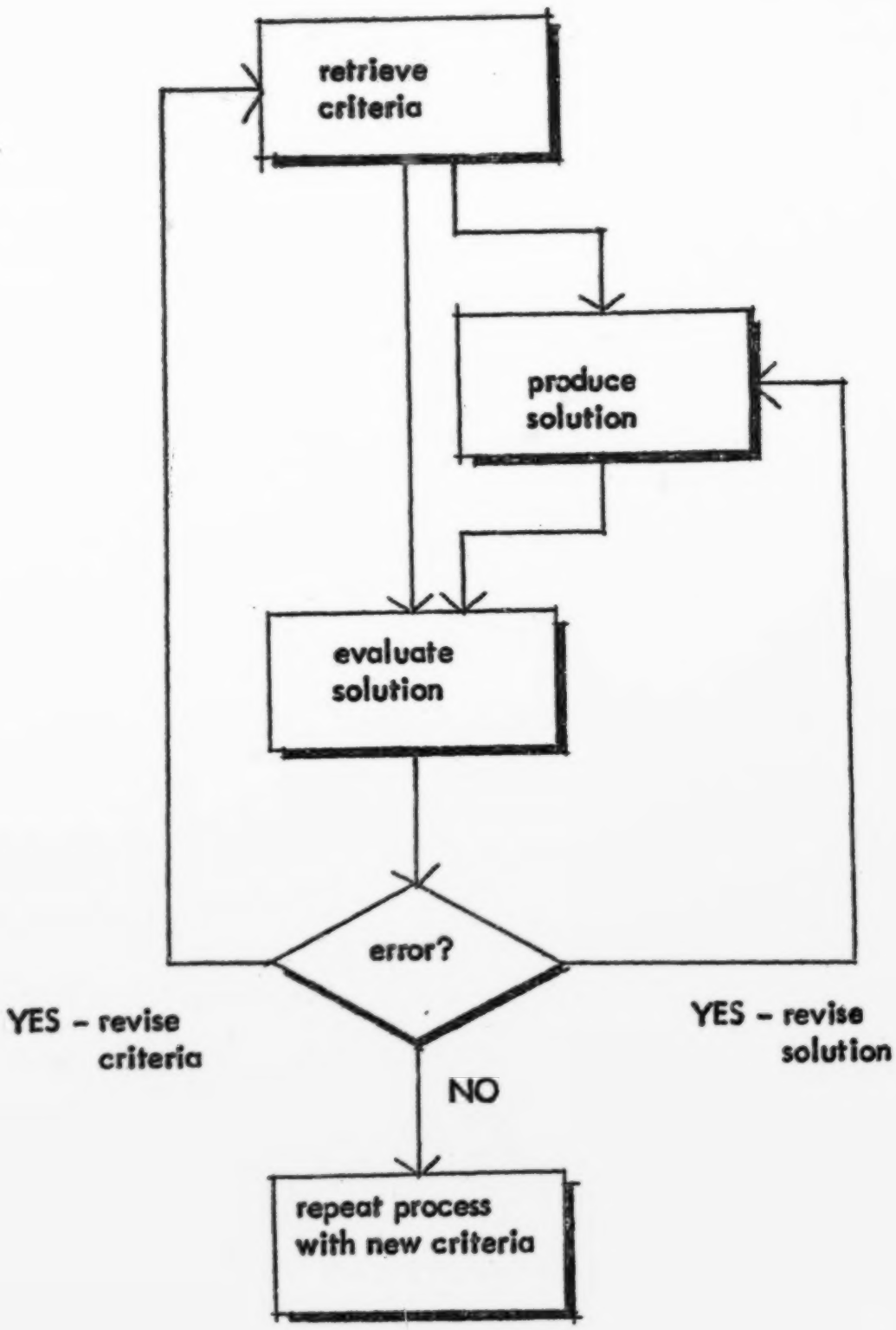

Figure 1 A Generalized Model of the Design Process

convenience outlets often falls in the realm of "standards" -- that is, criteria which apply equally to the bulk of jobs rather than specifically to a few jobs. Looking at those criteria which are unique from job to job, however (and I should say that this body will vary from job to job, and from designer to designer -- a criterion which is "obvious" in one instance will need to be carefully detailed in another), we have to ask ourselves the question -- where do they come from?

The chances are that they will be gathered by the usual techniques: interviewing, research, observation, literature search, etc. They will be "client-oriented" -- that is, they will be in his language and gathered within the framework of his organization. The chances are that the information will be of widely varying degree of detail: some applying to the project as a whole, some applying only to specific portions of that project.

THE PROBLEM, THEN, IS SIMPLE TO STATE: HOW DO WE GET FROM ORIGIN TO DESTINATION? How do we take all this information, client-oriented, collected from his people, often in his language, and varying depths of detail and turn it into architect-oriented information, in his language, for his use, and oriented to the particular use he will put it to?

Take, for example, a project we are currently completing. Here is a large regional education center in Northern Westchester, New York, which provides educational programs and services to 13 public school districts in that area.* The client's activities ran a wide gamut, including,

programs for 450 emotionally-disturbed and/or brain injured children
programs for 150 mentally-retarded trainable children
guidance and testing for the half-county area

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*The project was undertaken for the Northern Westchester Board of Cooperative Educational Services, Yorktown Heights, New York, and was funded by Educational Facilities Laboratories, Inc.

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media production and library services
a curriculum improvement center
educational research programs, specializing in developing units
of computer-assisted instruction
data processing
technical/vocational programs in 15 major areas
in-service education
administrative services to the 13 districts

The information collected on this project simply had to correspond to the client's own administrative structure (the programs and services I mentioned fall under 6 major administrative divisions). This is not the way the architect will use it at all. Certainly at one point, for instance, he cares how "data processing' will relate to 'vocational education'; however, he will also be interested in how the various parts of data processing relate to the various parts of vocational education, and so on and on; after the interrelationships are spelled out, he will then be anxious to investigate each of these parts in detail -- translating its environmental implications into facility requirements.

What is needed for the "bridge" between origin and destination, what we needed on this project, was some sort of tool which would,

1. Accept information which is client-oriented.
2. Allow the tagging, storage, and retrieval of this information.
3. Allow the decomposition of this information into various levels of detail, and,
4. Allow the merging and synthesis of this information at whatever degrees or levels required by the user (the architect, designer, financier, or whomever).

This suggests not only a careful structure, but also some sort of INITIAL QUANTUM LEVEL,

or BUILDING BLOCK of data. A quantum which can be further decomposed, but more importantly, a quantum which can be merged with others. At any point in this FISSION or FUSION PROCESS, then, USAGE CRITERIA MAY EMERGE.

In the project for Northern Westchester, we developed an initial quantum -- at least common denominator, if you will -- called the activity/space. It seemed to us that in a project this complicated, and this activity-oriented, we had to hit on something which would truly reflect what is happening. Since the regional education center is a collection of "activities" -- programs and services -- this activity-based approach seemed logical. It might be different with another project and in another situation.

Each of the six major administrative areas in the project was broken down into a series of component activity/spaces. The level of the activity/space, however, is a tricky thing: we know that "data processing" is too large a quantum -- it involves many diverse activities with diverse facility implications (machine, discussion, programming, coffee activities). Yet to break the data processing activities down too far -- to seeing, hearing, etc. -- will not generate any coherent facility implications. The initial "level" chosen is somewhere intermediate between the two extremes: the activity/space, simply defined, is an "activity which takes up space and has a generally common set of facility implications".

One of the major "activities" undertaken at the regional center will be guidance and counseling. Here the activity/spaces include ones like,

reception
lounge and waiting
coats
occupational resources
individual counseling and testing
group counseling
group testing

clerking
records, etc.

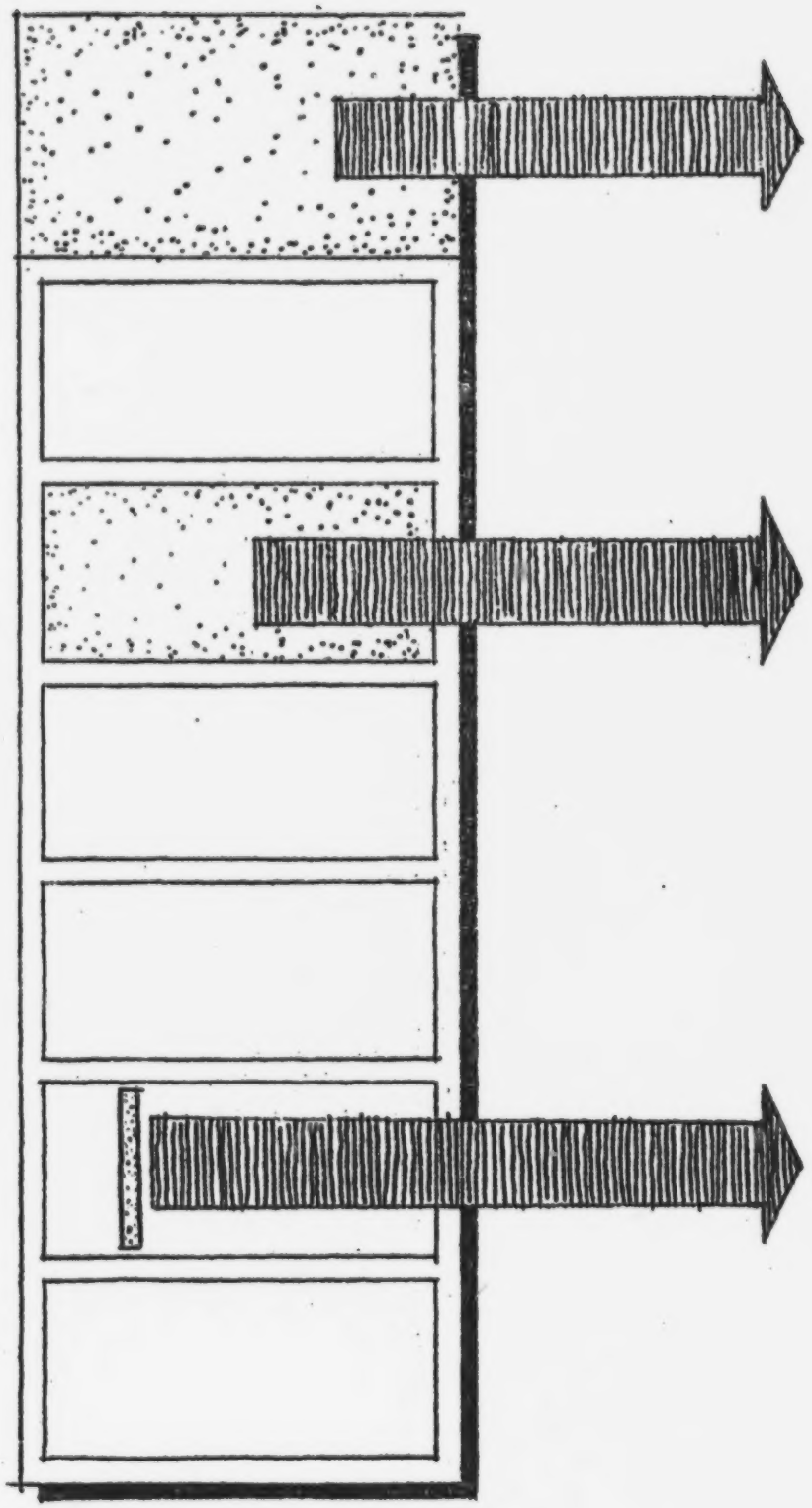
You will notice that each of these could be a room or definite building space, but then again, it could be more than one room ("counseling" might require several), or it could be only part of a room ("clerking" and "records" may have the same use patterns and facility implications, allowing accommodation in a single area -- or maybe "group counseling" only uses a conference-type area 50% of the time and could share it with another compatible use). What I am trying to say is that it is not yet a space -- just an activity which takes up space.

The next step is to treat the activity/space like a file drawer in a large filing cabinet (Figure 2). We begin to enter the data we have gathered about the activity:

what is it?
who is involved? do they stay or just come and go?
who comes and goes and from where?
what kinds of material come in and go out?
what kind of access is involved? directly from reception?
directly from circulation? insulated from the public?
to the outdoors?
how does it relate to other activity/spaces?
what kinds of environmental implications are there -- for
the visual surroundings? acoustical? mechanical?
what kinds of furniture and equipment are required?
what special features are involved?
how much space does the activity consume?
what may change?

At this point, too, we can begin to enter data at levels other than just the file drawer. Some drawers (activity/spaces) may be tentatively grouped into a file cabinet -- and some information entered at the cabinet level -- applying to all the drawers. Or within the activity/space drawer, we may enter data on file "cards" -- elaborations on equipment, access, and others.

We did this in the project of which I speak. The next step is a flexible one, depending on the demands of the problem. In the case of the regional center with many diverse activities which



FILE CABINET INFORMATION
descriptive data pertaining to all of the activity/spaces in the group

FILE DRAWER INFORMATION
activity/space level

1 Name and Code Number
2 Activity Description
3 Utilization Data
4 Access
5 Environmental Requirements (visual, acoustical, climatic)
6 Furniture and Equipment
7 Special Requirements
8 Subjective Requirements
9 Space Required
10 Additional Information as required (such as Commerce Patterns with other activity/spaces)

FILE CARD INFORMATION
elaborations on any of the activity/space elements above

Figure 2: A "File Cabinet" of Programming Information

should be cross-fertilizing and feeding each other, the interrelationship among the activity/spaces was deemed crucial. The next step, therefore, involved using the drawer information to express functional relationships among the activity/spaces and then to derive, from this data, the requisite physical interrelationships. The particular mechanism we chose for this was COMMERCE -- the flow of people and material from activity/space to activity/space. We isolated 8 different types of commerce, and weighted the flow of each type between each pair of activity/spaces according to the frequency of its flow (Figure 3).

This in time led us to make a rather subjective stab at the PHYSICAL AFFINITY (or ADJACENCY) of one activity/space for another. These adjacencies tell how "close" one activity/space should be to another, and are expressed (in this case) in such general terms as "direct", "indirect", and "convenient".

Plotting these affinities begins to give us a look at the project's organization -- at least from the commerce point of view (Figures 4 and 5). In the Westchester project, it served to verify our expectations that the overall building concept would not come from moving balloons marked "data processing" and "guidance center" around on a big board. The "true" organization of the project in terms of its commerce shows an organization which bears only a faint resemblance to these administrative divisions.

The next step might involve a restudy of affinities, using some yardstick other than commerce. In other words, it might be desirable to reorganize on the idea of grouping all activities requiring air conditioning, seeing how this modifies the commerce-produced relations.

Just what the user -- and you will note that the clear distinction between programmer and designer seems to have evaporated -- does next is up to him and the demands of the situation. The demands of the Westchester situation were that we provide sizes, square footages, etc. for budget and fund-

A/S PAIR		SEC	STF	BOC	VIS	STU	PAK	MED	DTA	ADJACENCY
B21 GUIDANCE RECEPTION/LOUNGE										
D21 B04	SPECIAL EDUCATION INTERRN STAFF	0	2	0	0	0	-	-	-	CONVENIENT
D21 B23	CLINICAL SERVICES CO-ORDINATOR	0	2	1	1	1	-	-	-	CONVENIENT
D21 B24	CLINICAL STAFF: RESIDENT	0	2	1	1	0	-	-	-	CONVENIENT
D21 B25	CLINICAL STAFF: NON-RESIDENT	0	2	1	1	0	-	-	-	CONVENIENT
D21 B27	SPEECH THERAPY: STAFF	0	2	1	1	0	-	-	-	CONVENIENT
D21 B28	SPEECH THERAPY: TESTING CENTER	0	2	0	0	2	-	-	-	CONVENIENT
D21 B41	ED/B1 INSTRUCTION: GROUP	0	1	0	0	2	-	-	-	CONVENIENT
D21 C15	RESEARCH OPERATIONS	0	2	0	0	2	-	-	-	CONVENIENT
D21 C17	TERMINAL AREA	0	1	0	0	2	-	-	-	CONVENIENT
D21 D01	P&G SECRETARIAL/RECEPTION	2	0	0	1	0	-	-	-	
D21 D22	OCCUPATIONAL RESOURCES	0	2	1	1	5	-	-	-	DIRECT; VISUAL ACOUSTICAL NO ENCLOSURE
D21 D23	HEAD COUNSELOR	5	2	4	4	2	X	-	-	DIRECT
D21 D24	GUIDANCE STAFF	2	2	1	1	5	-	-	-	DIRECT
D21 D28	GROUP TESTING	0	2	2	2	5	-	-	-	DIRECT
D21 G01	RECEPTION/INFORMATION	0	0	1	2	1	-	-	-	
D21 G12	VISITING STUDENT DINING	0	0	0	0	4	-	-	-	CONVENIENT
D21 G21	MAIL & PARCEL DISTRIBUTION	0	0	0	0	0	X	-	-	ON CIRCULATION
D21 G41	TRANSPORTATION	0	0	0	0	4	X	-	-	CONVENIENT

Figure 3: Commerce Patterns and Adjacencies for 1 Activity/Space

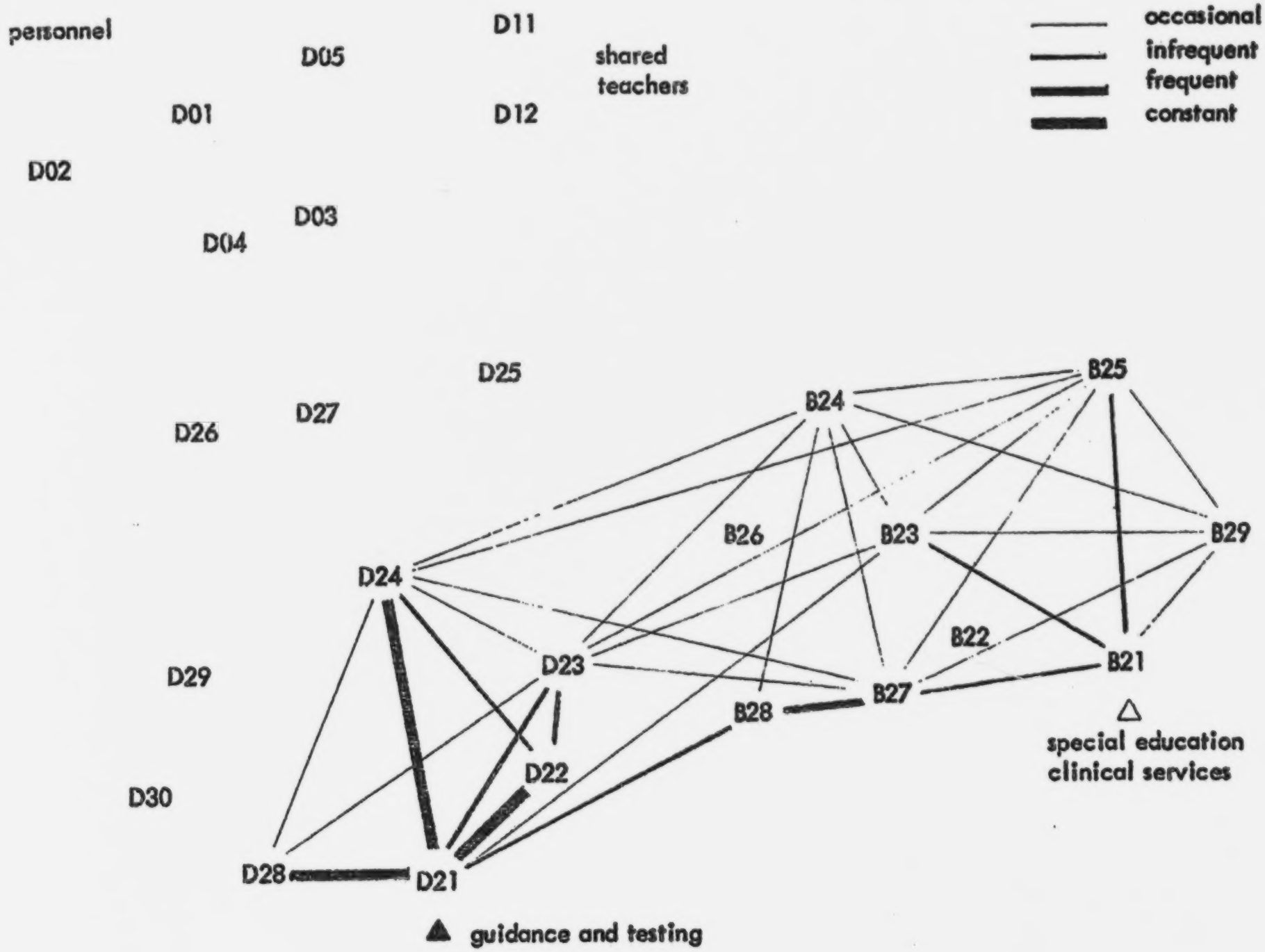


Figure 5: Student Commerce Subsystem: An Example Using 27 Activity/Spaces

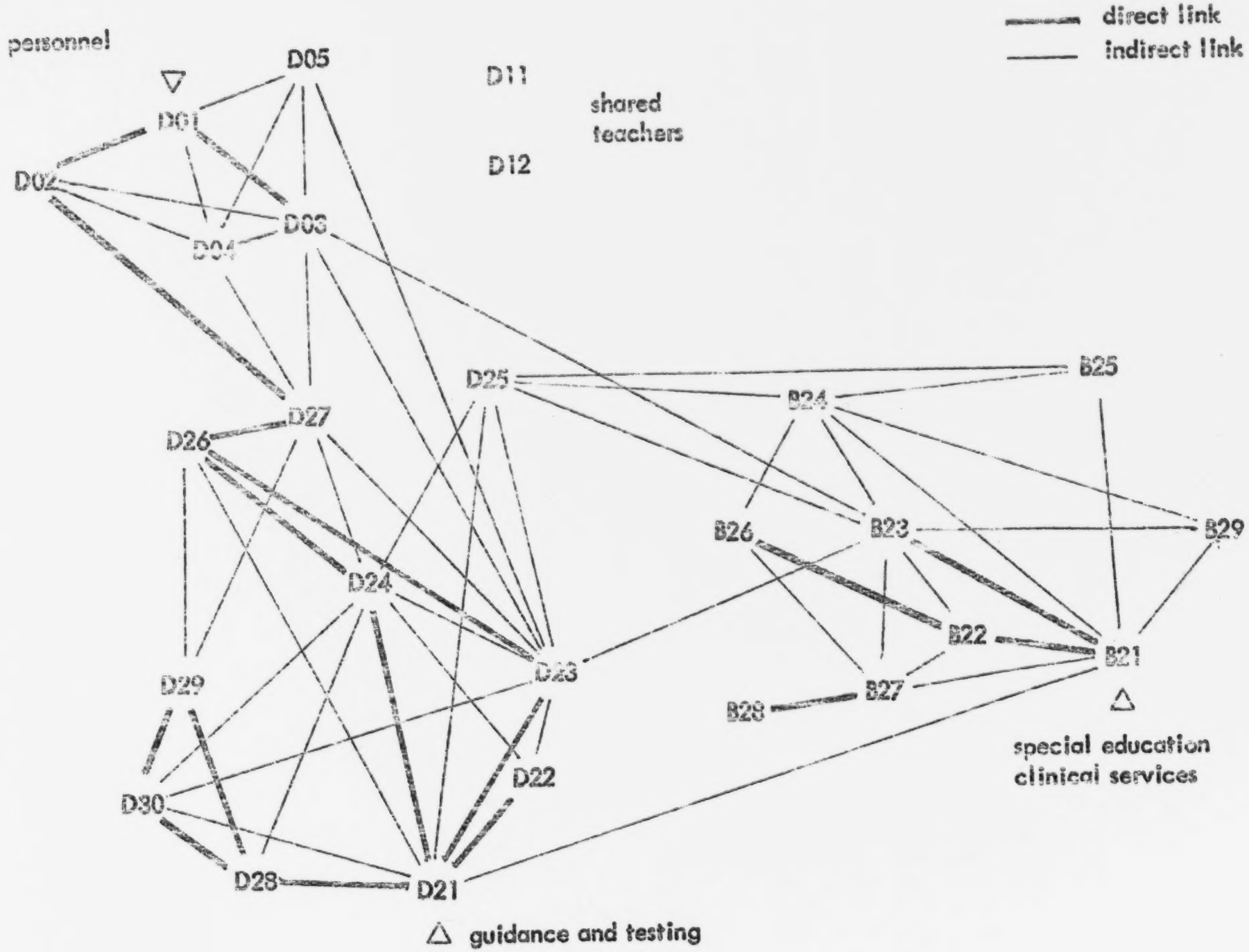


Figure 4: Direct and Indirect Adjacencies: An Example Using 27 Activity/Spaces

raising purposes. So we began to translate the activity/spaces into building spaces. As suggested before, some merged with others, some generated one building space, others many building spaces, and still others only portions of building spaces. When an activity only required a particular kind of space on a part-time basis, the tool allowed us to search for comparable activities for the same space.

The next step in our effort involves reorganization and re-expression of the data base to serve many of the other ends in programming and programming/design. It is hoped that the project staff can carefully monitor the architect as he uses and manipulates the data base. This will give us further directions for modifying the approach and for designing the actual "tool" (most likely a series of computer programs) for performing the manipulations.

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I will be the first to admit that the process was pretty crude in our Westchester application. We did the job by hand -- there were, for instance, 165 of those activity/spaces, which means there were some 13,000 potential affinities in the project. We were subjective, intuitive, and inconsistent.

The point is this, however: we do think we found a tool which set up a data base -- oriented to getting information in, manipulating and massaging it, and then to getting criteria out as needed by the architect. We used data processing techniques only for the most clerical of tasks,-- this was all time and funds allowed -- but an on-line computer system is clearly in view. The introduction of the computer in a conversational capacity -- constantly retrieving, displaying, and manipulating the data base under the user's direction -- would bring coherency and consistency to the process of data manipulation and criteria formulation.

Of course, file drawer approaches are hardly new. But a dynamic filing system, allowing both

fission and fusion of chunks of data to produce design criteria, will be entirely necessary as projects become more complex and as programming data multiplies. Under constant control of the user, it will hopefully allow adaptation to varying situations, and will help to eradicate the often arbitrary division between programming and design.

Nor are such approaches without their dangers and pitfalls. We all know that systematic approaches, if not carefully controlled, can masticate and destroy data. We all know that there are dangers of "hardening of the categories". We all know that the user may be a victim of false precision, or he may suffer from delusions of accuracy.

For all I know, this happened to us on the Westchester project -- the results won't be in until the architect begins working with the requirements as detailed in our "program". So far, though, we feel that the need to do something has been worth the risks.